Allocation of Natural Resources

W. E. Westman and R. M. Gifford (31 Aug., p. 819) argue that, because current pricing practices do not internalize environmental costs, some mechanism other than the market is needed to protect environmental values. They propose a system of environmental credits—natural resource units (NRU's)—to be allocated to individuals and industrial organizations.

Although their system is ingenious, I offer the following objections.

1) The system is, first of all, terribly cumbersome. If most families now have difficulty in keeping track of one checking account, think of the problems of maintaining two accounts.

2) How would environmental qualities be evaluated in terms of NRU's? Clearly the process would be extraordinarily cumbersome, arbitrary, and expensive. Maintaining a bureaucracy for establishing and managing NRU's would in itself have a major environmental impact.

3) As I have already pointed out (*1*), in addition to externalizing environmental costs, industrial activities have failed to internalize human health costs. Because NRU's would not provide equity for those costs, would there not be justice in demanding still a third system of allocating human health costs, or HHC's, to individuals? A monthly electric bill, for example, would then list dollars, NRU's, and HHC's separately, to be paid from three different accounts.

4) Last, and most important, there is a far simpler solution available—the use of taxes to internalize environmental and health costs so that each consumer pays his fair share.

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We agree that the bureaucratic difficulties of administering an NRU (natural resource unit) accounting system are imposing, and, in our article, we referred to the problem as a "bureaucratic bugaboo" (p. 822). This disadvantage must be weighed, however, against the current disadvantages accruing to society by the failure to account adequately for environmental externalities through present economic procedures. Furthermore, as the need to control environmental impacts increases in the future, administering an assortment of regulations, taxes, subsidies, quotas, depletion allowances, and rations may not remain a simpler or more successful way to achieve a unified and equitable system of allocating "environmental credits" than a system such as we described.

On the problem of evaluating environmental qualities, we acknowledge an element of arbitrariness in constructing an NRU budget but note its parallels in the economic planning decisions of a modern mixed economy. In either case, the responsiveness of government allocation decisions to public desires must be continually checked through polls; in the case of NRU's, additional information would be derived from continual observation of NRU spending patterns.

With regard to accounting for human health costs, we agree with Sagan about the importance of incorporating this "externality" into an accounting system; protection of human health is one of the implicit parameters we envisioned would be considered in the setting of levels of total release of NRU's for particular pollutants. Sagan reminds readers of the disadvantages of introducing more new accounting procedures than absolutely necessary; on these grounds we would think "HHC's" [human health costs] could be adequately taken into account within the decisions of an NRU budget.

Sagan's last point, the use of traditional economic taxes to mediate the "price" of pollution and environmental health, has of course been a widely discussed idea in recent years. We commented in our article that "a uniform pollution tax allows those individuals and firms who are initially rich to purchase 'licenses' to pollute the common environment to a degree that may be out of proportion to the value of their service to society" (p. 823). A major reason for the introduction of a new allocation unit would be the opportunity to eradicate immediately initial inequalities of access to selected items—those of high environmental impact—without eradicating all present wealth inequalities.

The use of taxes presents the additional danger that revenues from taxes may be reinvested by the government to develop new resources, in turn generating further environmental impacts (*1*), whereas NRU's cannot be so reused.

There is another distinction between taxes and NRU's which may bear closer investigation. We have some evidence from those with whom we have discussed the NRU system that individuals may well be willing to apply a price in *new* units to items which have not traditionally been priced with money (for example, childbearing). This phenomenon may arise partly because the new units permit a particular subset of activities and resources to be priced which are more directly comparable to each other than they are to the present range of items priced with money.

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A Spherical Chicken

The report "Energy expenditure in animal locomotion" by Albert Gold (20 July, p. 275) may indeed pose an essentially correct solution to an important bioenergetic problem. Nevertheless, Gold's supposition, "For a sphere of unit density, $k^{1/3} \approx 1.6$ g$^{1/3}$ cm^{-1}," irresistibly calls to mind the following famous story.

A certain commercial farm was having great difficulty raising its egg productivity. Every suggestion they attempted failed to increase the output of its hens. For 1 year they tried special feed formulas, hormones, minerals in the hens' drinking water, piped in music (rock and classical), soft lights, ambient temperature variation, and even specially imported roosters, all with the same notable lack of success. In desperation, they finally took the suggestion of an extension officer to hire a theoretical physicist. After 3 more months of agonized waiting, the theoretician announced to the anxious farmers that he had the solution to their egg problem. He strode up to the blackboard and confidently began, "Postulate a spherical chicken . . ."

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